Near-Term Analysis Plan

Summary

The analysis plan for the near-term, approximately the next two months, is determined mostly from the scanning capacity in Nagoya, and to a lesser extent, by the electronic analysis capability in the US. A change of strategy is dictated by the operating schedule of scanning machines with the faster UTS (Ultra Track Selector) electronics. Recall that the present track selector (TS) can digitize a $5\times5\times10$mm^3 volume in about 16 hours. Performance tests on the UTS show that a $5\times5\times70$mm^3 volume, a column through the whole module, takes typically 12 hours. This is a speed increase of 9. It is expected that 3 UTS-equipped machines will be available to DONUT by mid-June. Because of the major impact of this future capacity, the present analysis should be optimized for the present capacity, and anticipating the eventual capacity.

The following points reflect the projected increase in scanning capacity:

♦ The reasons for *not* locating events with Net scan need to be understood
♦ The simpler events (amenable to CS location) should be selected and refit first
♦ The volume of scanning needs to optimized with the present vertexing accuracy

This program is a part of the general push for increasing the fraction of located events. Presently, only about 23% of all events from the `/cat3` directories have been found. Approximately 50% of these events were deferred from any location analysis because the vertices are considered too uncertain in the Nagoya analysis. Probably, very little information from the Refit events are now used in Nagoya. The accuracy of Refit events using Vertex Processor 3 is probably better than what is now used in Nagoya and for the located event sample, the measured accuracy is $\sigma_{u,v} = 0.6$mm and $\sigma_z = 3.6$mm.

Plan

Period 4 Data

There are about 90 events on which Net scan was attempted, but the primary vertex was not found. It is quite possible that many of the interaction vertices were outside the search area which had a size along the beam of $\Delta z = 10$mm. Since this volume is about 1σ using older reconstruction methods, it is not surprising that a large fraction of the events were missed. It was agreed that for these events (and presumably all others to follow) the volume searched in Net Scan will be appended to the text file for these events in Nagoya (or sent in some other way) and sent to the US. This volume will be compared to the best estimate for the vertex with the present code (Vertex 3) and if the searched volume did not include this vertex estimate, the event is scanned again, appending information from an additional 10mm-long volume. Many of the events that have had location attempted have not been refit. Obviously, these events need to refit at higher priority. A status list of all events from Period 4 will be generated at Nagoya, giving the location status for each event or if the event was "deferred" from further analysis.

There are also approximately 64 events which have <3 spectrometer tracks, but the events could

not be found by using the CS location method. The tracks were not connected between CS and the SFT *or* the CS to SS connection was missing. If either link were missing, the track was considered lost and the analysis stopped. This set of events needs to be studied to see why connection was difficult: is the SFT tracking unreliable even for these simple events? More likely, the connection is missed in the emulsion analysis. A way to increase connections is to require one, but not both connections, *i.e.* from SFT to CS *or* from SFT to SS.

Candidate Events

A new set of special events was presented at the meeting, including about 10 events that are new to the US group. Text files for these events, perhaps including information from many plates downstream of the vertex, will be made at Nagoya. Once this file is received, the US group will attempt to connect emulsion tracks to the spectrometer and help determine the status of the events.

Period 3 Events

Since events that can be located by CS scanning will not benefit significantly from the UTS-equipped stations, it makes sense to attempt location of the "easy" events as soon as possible. Almost all the Period 4 CS events have been attempted, so the next-largest set, Period 3, should be attempted next. All events from Period 3 will be reviewed first, to determine which events can be eliminated from the CS set immediately. Events that have showers in the SFT, so that 3-D tracking is very difficult, are eliminated. After some tests, it may be possible to pre-process Period 3 events before refitting, using cuts on the number of SFT hits per station, or too many VDC / DC hits.

List of Jobs

1. Study Vtx 3 estimated errors for located events and compare to actual deviations
2. Incorporate Vtx search volume in summary files
3. Add information on Nagoya search status to summary files
4. For Per 4 events that failed in Net scan and are refit, determine additional search volumes
5. For Per 4 events that failed in Net scan are are *not* refit, Refit them
6. Study 64 events with NS<3 that failed CS location
7. Study / refit candidate events, match emulsion tracks, classify with event parameters
8. Pre-select Per 3 events for CS scanning
9. Refit selected Per 3 events for CS scanning
10. Calibrate Calorimeter